
RE: Validity, relevance and revision of aquatic specialist recommendations for continuation of construction of the Gwaing River Bridge.

1. Introduction

Aquatic specialist inputs were requested as input to the renewed efforts to construct and finalise the doubling of the Gwaing River Bridge on the N2 in George, Western Cape. The original project was approved in terms of the National Environmental Management Act (NEMA; Act No. 107 of 1998) and the National Water Act (NWA; Act No. 36 of 1998), but construction of the bridge has not been completed to date.

Given that construction of the bridge was halted partway, and that in the few years since, there have been major floods, it is necessary to reconsider the original conclusions of the aquatic specialist to determine whether any adjustments are necessary. Remaining works on the roadway are limited to pavement construction, surfacing, and finishing of side drains, inlet and outlet structures, and related minor works. Remaining works on the bridge itself are limited to the construction of the two westerly spans (box girder structures) and deck, with all three piers already completed. However, the in-situ construction of these spans must necessarily be completed from within the river itself, requiring the reinstatement of temporary crossings, temporary river diversion, formwork, and scaffolding within the river.

A brief statement for the proposed recommencement of works was provided by the Environmental Assessment Practitioner (EAP) as follows:

1. Reinstatement of temporary works to provide access to works area (i.e. temporary culvert(s), fill, coffer dams, and causeway).
2. Removal of previous and new temporary works on completion of construction and reshaping and possible stabilisation of eroded banks.

2. Site Visit

The site was visited on 19 March 2026 to establish the current condition of the river, and the extent to which conditions may have changed since the previous aquatic specialist report was written.

The main observations made during the site visit are as follows:

- The culvert used for the initial river diversion is completely blocked by debris and much higher than the current stream baseflow.
- The causeway that was built across the river was washed away. Only a concrete platform on the West bank next to the diversion culvert remains.
- Extensive construction-related debris remains around the river which includes: broken pipes, concrete blocks, fill material (stone-chips and G5), metal rebar, sandbags, large sacks full of sand and rocks.
- Extensive alien vegetation is growing throughout the old construction area, although the entire river system is densely invaded. Dominant large species include Black Wattle (*Acacia mearnsii*), *Eucalyptus* spp., and Spanish Reed (*Arundo donax*). Smaller herbaceous species include goosefoot (*Chenopodium* sp.) and nightshade (*Solanum* sp.)
- Serious channel incision has occurred following flood events, but especially following the 1:150 rainfall event experienced in November 2021. Large areas of bedrock are exposed, and eroded banks are around 3m high.
- No water quality testing was undertaken as part of this assessment, but water quality appears to be poor, with thick green filamentous algae indicative of eutrophic waters attached to stream substrates. This is not specifically construction or site-related, but reflective of upstream impacts associated with the Gwaing Wastewater Treatment Works, George Landfill site, and localised water abstraction for farming.
- Remnant wetland vegetation typical of large wetland systems in George is present up and downstream of the construction area and includes *Psoralea affinis* (fountain bush) and *Cliffortia odorata* (no odour caperose).

It is clear from the site visit that impact minimisation during construction and post-construction rehabilitation should receive the most attention when the project restarts.



Figure 1. Photo of the Gwing River bed looking upstream towards the N2 bridge.

3. Existing Conditions

The Environmental Authorisation (EA) was consulted to determine the existing conditions for the construction and operational phase which have relevance to the aquatic environment. The list provided here indicates conditions that must be reiterated and applied to recommencement of this project. This list provides relevant extracts from the EA, and is not exhaustive. These points are listed as follows:

Monitoring

- The holder of the authorisation must appoint an experienced independent Environmental Control Officer (ECO) for the construction phase of the development that will have the responsibility to ensure that the mitigation/ rehabilitation measures and recommendations referred to in this environmental authorisation are implemented and to ensure compliance with the provisions of the approved EMPr.
- The ECO must remain employed until all rehabilitation measures, as required for implementation due to construction damage, are completed and the site is ready for operation.

Specific conditions

- No exotic plants must be used for the rehabilitation purposes, only indigenous plants of the area may be utilised.
- No activities will be allowed to encroach into a water resource without a water use authorisation being in place from the Department of Water and Sanitation.
- Vegetation clearing must be kept to an absolute minimum. Mitigation measures are specified in the BAR dated May 2017 must be implemented to reduce the risk of erosion and the invasion of alien species.
- Any solid waste must be disposed of at landfill licensed in terms of section 20 (b) of the National Environmental Management Waste Act, 2008 (Act No. 59 of 2008).

The Freshwater Specialist Assessment (KSEMS, 2016) provided specific conditions regarding rehabilitation post-construction which are listed verbatim as follows:

"It is the responsibility of the contractor to appoint a suitably experienced rehabilitation specialist to implement an approved Wetland Rehabilitation Plan. The specialist shall have a sound knowledge of the vegetation types and communities of the site and his/her appointment must be approved by the Environmental Control Officer (ECO). The plan shall include (but not limited to):

1. *Detailed rehabilitation methodology;*
2. *Details for potential structures proposed within existing systems to assist with the prevention of further erosion and improve flooding of wetland systems;*
3. *Methods for the removal and control of alien invasive plant species within the wetland and riparian areas;*
4. *Assessment of current vegetation species within the study site;*
5. *Proposed plant species to be replanted in the wetland and/or riparian areas; and*
6. *Monitoring requirements to assess how successful the rehabilitation techniques are within the systems.*

The operational phase mitigation measures are also important and reiterated here:

- *The establishment and infestation of alien invasive plant species must be prevented, managed and eradicated in the areas impacted upon by the road and bridge upgrade. The type of species and location of that species will determine the type of methodology required for its management and eradication. This methodology should target all lifecycle phases and propagules of the specific species, e.g. seedlings/saplings, seeds, roots, etc.*
- *Indigenous vegetation within the site must not be removed or damaged, where possible, during the alien plant control, increasing the probability of indigenous species propagating and preventing the reestablishment of alien species.*
- *As stated above, any use of herbicides in removing alien plant species is required to be investigated by the ECO before use, for the necessity, type proposed to be used, effectiveness and impacts of the product on aquatic biota.*

The report recommends that post-rehabilitation efforts be permanently recorded by establishing fixed photo points at commencement of construction. In this way, progression of the site through construction and rehabilitation can be monitored to conclusion.

The only impact not covered specifically in the aquatic specialist report, relates to the serious channel and bed erosion that has occurred post-flooding. However, this is covered in general in Point 2 of the stipulated rehabilitation plan, which is considered sufficient for guidance of a aquatic specialist's rehabilitation planning post-construction.

4. Recommendations

It is recommended that work recommence on the site to prevent further delay in finishing the project. The longer the site is left in an abandoned state, the more difficult rehabilitation efforts post-construction will become (e.g. large alien trees). The following recommendations are really reiterations of the existing mitigation measures, and are emphasised to highlight their importance based on the current site condition:

- Existing erosion damage and remaining construction materials must be addressed in the river. While there is little point addressing this issue during construction, it is necessary that post-construction rehabilitation be undertaken with inputs for an aquatic specialist. This is because some of the impacts and their extent are difficult to predict, and rehabilitation measures to address them would require on site assessment following construction.
- Rehabilitation efforts must focus on two key aspects, being a) stabilisation of eroding banks, preferably through building up the river bed towards its original level (or at least a bit closer towards that); and b) control of alien vegetation through removal and active planting with indigenous plants. The latter will require ongoing maintenance until indigenous vegetation has established at least 80% cover in the construction footprint area.
- Monitoring of water quality must be undertaken during the construction phase, and every effort must be taken to minimise or eliminate sources of siltation during construction. Monitoring should focus on basic parameters such as Electrical Conductivity, pH, Dissolved Oxygen and clarity (simply measured using a clarity tube). These are easy and cost effective parameters that can be measured by the ECO.

- Given the high intensity rainfall events that George can experience, the Gwaing River can be subject to rapid, severe flooding. Care must be taken during the construction phase to remove or secure any materials, equipment, machinery etc. well above the 1:100 year flood level.
- Clearance of alien vegetation from the construction footprint doesn't need to be postponed until the conclusion of construction. Where no further disturbance is anticipated, alien vegetation should be controlled to reduce the work required at a later point.

5. Conclusions

Overall, the highlighted mitigation measures and conditions along with others in the original freshwater specialist report are considered comprehensive, applicable and they should be fully implemented to ensure the best outcome for the Gwaing River through this project. The contribution of the ECO in compliance monitoring in this regard is important and the ECO must be highly familiar with the mitigation measures of the freshwater report as well as the EA conditions. It is my opinion that the existing conditions of approval for this project are adequate for the protection of the affected aquatic ecosystem provided they are fully implemented.

Yours Sincerely,



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